DOCUMENT RESUME

ED 089 353 CS 201 180

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TITLE Associative Verbal Encoding (a/v/e): A Measure of Language Performance and Its Relationship to Reading Achievement.
PUB DATE Mar 74
NOTE 9p.; Paper presented at the Annual National Conference on the Language Arts in the Elementary School (6th, Seattle, March 15-17, 1974)

EDRS PRICE MF-$0.75 HC-$1.50 PLUS POSTAGE
DESCRIPTORS *Association Tests; *Associative Learning; Grade 4; Reading Ability; Reading Comprehension; *Reading Improvement; *Reading Research; *Verbal Ability
IDENTIFIERS *Associative Verbal Encoding

ABSTRACT

This study examined the assumption that language expression and reading performance are related processes. Subjects included a total of 676 nine-year-old children of heterogeneous socioeconomic status, intelligence, and achievement levels. Verbal fluency was defined as being a measure of associative verbal encoding (a/v/e), wherein children give single word associations to a stimulus word. Two hypotheses were examined: (1) a/v/e would improve with training, and (2) associated with a/v/e would be concomitant improvement in reading achievement. Training in a/v/e involved encouraging subjects to give as many responses as possible to the stimulus words. Two training periods were held daily and conducted by the regular classroom teacher. Only two verbal stimulus words were presented at any one time. In the control classes an equivalent time block was devoted to general language arts instruction. Subjects were unaware that an experiment was in progress. Results showed the experimental group improved in a/v/e, vocabulary, comprehension, and total reading performance. It was also determined that a/v/e could be reliably quantified and measured. (HOD)

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ASSOCIATIVE VERBAL ENCODING (a/v/e): A MEASURE OF LANGUAGE PERFORMANCE AND ITS RELATIONSHIP TO READING ACHIEVEMENT

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This study examined empirically the widely held assumption that language expression and reading performance are related processes. A reliable measure of language performance, associative verbal encoding (a/v/e) was developed. Subsequent experimentation indicated that the measure correlated significantly with reading achievement. Training in language performance resulted in improved achievement in both language expression and reading. Implications of the study were considered both theoretically and from an educationally practical point of view.

Introduction

This study represents an attempt to add to the empirical data available in basic research in reading. The theoretical rationale which constituted the basis for the research was related to the general hypothesis that language ability is an important concomitant of reading success. Although this appears to be a widely held assumption in the literature, there seems to be all too little supportive empirical evidence and what data there are appear to be equivocal, if not contradictory (Weintraub, 1968).

In order to examine the rationale underlying the study, it seems necessary first to consider the processes involved in reading. There seems to be a growing consensus in the literature that reading behavior is a cognitive function - a cognitive search for meaning, in fact. Both Brown (1970) and Smith (1970) have suggested the possibility that the skilled reader engages in a highly selective sampling of visual data and

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that he combines these data with his linguistic knowledge of semantic, syntactic and within-word orthographic constrains in order to construct hypotheses as to the meaning inherent in printed material. Hochberg (1970) supported this position in stating that rapid reading is ascribed to effective sampling abilities in a cognitive search for meaning. Hochberg felt that this observation was consistent with the empirical finding that one observable difference between skilled and unskilled readers is in the number of fixations required to take in a line of text, the skilled reader using fewer fixations and larger saccades, thus appearing to sample information rather than to read in a letter-by-letter or word-by-word sequence. Levin and Williams (1970), also noted that reading may be tied to information processing. According to them, the reader samples the cues on the printed page and, using these partial cues, forms hypotheses as to meanings which are confirmed or disconfirmed by subsequent samplings.

Another factor bearing on the rationale of the present study is the notion that linguistic performance might well be a function of retrieval of information already in storage (Mickelson, 1970; Vicory & Asher, 1966), and that improvement in any facet of linguistic performance, either that of decoding or encoding, might well be related to response availability or to an easily accessible verbal repertoire within an individual's linguistic competence. This seems consonant with Staat's assertion (1968) that word association sequences that an individual has acquired in his general language experience are part of the learning that produces skilled reading performance; with Ruddell's suggestion (1970)

that there is a relationship between comprehension and lexical performance; with Samuel's notion (1970) of a relationship between an individual's response availability of words to reading success; with Singer's inclusion (1970) of word meaning as a basic element in both power and speed of reading; and with Venezky's and Calfree's hypothesis (1970) than an associative word store is one of the key components of reading success.

Under this rationale, a readily available verbal repertoire would seem to be an essential component in any theory of reading which suggests that reading is essentially a process of hypothesis-testing behavior in the subject's cognitive search for meaning. An even more intriguing extension of this idea is that language performance, specifically the decoding process of reading and the encoding process of language expression, might both reflect linguistic competence - an underlying, biologically based structure which is shared by all members of the species (Chomsky, 1965). Related to this is the positing by many linguists that a deep level of linguistic competence at which an utterance is conceived is neutral with regard to its ultimate expression as oral speech, writing, reading, or thought (Frances, 1970). Within this frame of reference, then, improvement in one aspect of language performance reflecting linguistic competence might well result in improvement in another.

Method

One aspect of language performance which has long been a matter of concern in education and psychology is verbal fluency. Rarely, however, has it been examined empirically in relation to reading achievement

although, as has been noted, several researchers have suggested a possible connection between a subject's verbal repertoire and success in reading. Little empirical evidence, however, has been forthcoming in support of the various hypotheses that relate verbal fluency to reading achievement. This study, therefore, was designed to examine this relationship empirically.

The total number of subjects used in all phases of the study was 676. All subjects were nine-year-old children attending school in the Greater Victoria area on southern Vancouver Island, British Columbia, Canada, and represented a heterogeneous sample in terms of socio-economic status, intelligence, and achievement levels.

In the study, verbal fluency was defined as being a measure of associative verbal encoding (a/v/e), an aspect of language performance wherein children give single word associations to a stimulus word in order to establish a measure of verbal fluency (associative verbal encoding).

A major, primary problem associated with any study of language performance is the provision of a valid and reliable measure of the variable of interest, in the case of this study, associative verbal encoding (a/v/e).

Two forms of a test of associative verbal encoding, therefore, were constructed in order to obtain a measure of a/v/e for each subject (Mickelson, 1972). Estimates of reliability by test-retest, equivalent forms, and internal consistency ranged from .90 to .95.

Significant positive correlations in the order of .60 ($p < .01$) were found to exist between the measure of a/v/e and three measures of

reading achievement as assessed by the Metropolitan Achievement Test, Elementary Reading, Form C (1961), (N = 144). Although no cause-effect relationship could be inferred from these data, it appeared that associative verbal encoding and reading achievement were functionally related processes.

A basic question, of course, remained: if one facet of language performance, associative verbal encoding, could be improved would achievement in another aspect of language performance, the decoding process of reading, for example, be enhanced? It was to an examination of this question that the final part of this study was directed.

Two hypotheses were examined:

(1) Associative verbal encoding will improve with training.

(2) Associated with improved associative verbal encoding, if it occurs, will be concomitant improvement in reading achievement.

Subjects for this phase of the study numbered 423. There were 209 girls and 214 boys, in fourteen randomly selected classes. Only classes in which heterogeneous grouping had been utilized were used in the study. Classes were randomly assigned to treatment or control conditions and class means were used as the basic datum.

Training of a/v/e involved encouraging subjects to give as many responses as possible to the stimulus words. Noble's production method (1952) was used in training Ss. The total training program involved 96 words not included in the two forms of the test of a/v/e taken from Mickelson's Table of Meaningfulness (1969). Two training periods were

held daily and were conducted by the regular classroom teacher. Only two verbal stimulus words were presented at any one time in the training sessions. Subjects were encouraged to give as many responses as possible to each stimulus word in one minute. At the end of each training session, each subject recorded on a chart the number of responses he had made to the stimulus words. In the control classes, an equivalent time block was devoted to general language arts instruction. Training in the experimental classes was carried out by the regular classroom teacher as was the language arts instruction in the control groups. Subjects were unaware that an experiment was in progress. All testing was done by the experimenter in all classes, both control and experimental.

In each of the analyses, a/v/e, vocabulary, comprehension, and total reading performance, only the main treatment effect reached an acceptable level of significance ($p < .001$). There were no significant sex differences and no significant interaction effects. These results were interpreted as supporting the general hypotheses of the study. It would appear that associative verbal encoding is an aspect of language performance which can be reliably quantified and measured. Furthermore, associative verbal encoding appears to improve with training. In this study, associated with improved associative verbal encoding, was a concomitant improvement in reading achievement, specifically in knowledge of vocabulary, comprehension, and over-all reading performance.

Conclusion and Implications

As Levin and Williams (1970) noted, basic research is predicated on the belief that a more complete understanding of the phenomena in

question is in itself a worthy goal. They note an additional criterion for applied educational research, however: that of its relevance to the educational enterprise in providing a set of principles and generalizations that would be generally and immediately useful.

Implications of the present study are speculative in terms of the theoretical rationale provided but would seem to lend support to the notion that one aspect of language performance, the encoding process of associative fluency, is related to another, the decoding process of reading. Continuing research for a greater understanding of psycholinguistic processes and their inter-relationships would appear to constitute an educational and psychological imperative. At the same time, however, the results appear relevant to the educational setting immediately.

The present study was carried out in the subject's natural educational environment. Training of associative verbal encoding was easily handled by the classroom teacher. It would seem that by encouraging children to become fluent in verbalizing an already acquired linguistic repertoire, teachers might well be providing their pupils with a technique for access to word association sequences. Such access would appear to be one of the components of reading success and therefore constitutes a worthwhile educational endeavor.

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